

Table of Laplace Transforms

$$F(s) = \int_0^{\infty} e^{-st} f(t) dt$$

$$u(t) = \begin{cases} 0 & \text{for } x < 0 \\ 1 & \text{for } x \geq 0 \end{cases} \text{ is the Heaviside function.}$$

$f(t)$	$F(s)$
1. 1	$\frac{1}{s}$
2. $t^n, n = 0, 1, 2, \dots$	$\frac{n!}{s^{n+1}}$
3. e^{at}	$\frac{1}{s-a}$
4. $\sin bt$	$\frac{b}{s^2 + b^2}$
5. $\cos bt$	$\frac{s}{s^2 + b^2}$
6. $\sinh bt$	$\frac{b}{s^2 - b^2}$
7. $\cosh bt$	$\frac{s}{s^2 - b^2}$
8. $e^{at} \sin bt$	$\frac{(s-a)^2 + b^2}{(s-a)^2 + b^2}$
9. $e^{at} \cos bt$	$\frac{(s-a)}{(s-a)^2 + b^2}$
10. $t \cos bt$	$\frac{s^2 - b^2}{(s^2 + b^2)^2}$
11. $t \sin bt$	$\frac{2bs}{(s^2 + b^2)^2}$
12. $\sin bt - bt \cos bt$	$\frac{2b^3}{(s^2 + b^2)^2}$
13. $e^{at} f(t)$	$F(s-a)$
14. $f^{(n)}(t)$	$s^n F(s) - s^{n-1} f(0) - s^{n-2} f'(0) - \dots - f^{(n-1)}(0)$
15. $\int_0^t f(r) dr$	$\frac{1}{s} F(s)$
16. $t^n f(t)$	$(-1)^n \frac{d^n}{ds^n} F(s)$
17. $u(t-c)$	$\frac{1}{s} e^{-sc}$
18. $f(t-c) u(t-c)$	$F(s) e^{-sc}$
19. $f(t+T) = f(t)$	$\frac{\int_0^T e^{-sr} f(r) dr}{1 - e^{-sT}}$